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STATUS REPORT

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15. Supplementary Notes Translation of "Statusbericht," 2nd Quarter 1986, dated June 30, 1986, DFVLR Roentgen Satellit, Doc. No. TN4/0435.

16. Abstract Discusses project status of current activities, problems encountered, advancements made, and future plans in all areas.

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1.0 Overview and Outlook

1.1 Status of Projects

Summary

With regard to technical performance, the project is running according to plan. Since, as the result of the shuttle misfiring on January 21, 1986, and the corrective measures recommended in the Rogers Report, there is no binding shuttle starting date, an investigation is being conducted into the alternative possibility for a start with an Atlas/Centaur. The ROSAT-total cost to the end of the project - for a hypothetical starting date of April 1988 - are within the middle projection, which was given in writing to the BMFT in January 1986. A postponement in starting, be this the shuttle version or the Atlas/Centaur alternative, will incur an additional cost.

With respect to the time schedule, only the following statements are possible:

Earliest start readiness of ROSAT for a start on a shuttle: on April 27, 1988. Earliest start readiness of ROSAT for a start on an Atlas/Centaur given a decision by the end of the year: in November 1988. Present possibility for a ROSAT start in a shuttle per NASA projection of June 2, 1986: on September 1, 1991.

Documentation /3*

Project Plan

The project plan has not yet been presented to the DFVLR board because of reservations regarding the data processing concept during the mission.

Contract

Contract changes No. 5 and No. 6 to the main contract were signed.

Test and Integration EM/QM/STM

The systems tests have been concluded. The structure is completed, its overhaul is almost concluded, the sub-system components have been

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*Numbers in right margin indicate pagination in the foreign text.

transposed to the wooden model. The additional tests in the EM-phase have seen slight postponements in the planning, however, they will have been concluded by the end of the next quarter.

Test and Integration FM

Planning calls for a removal of the sub-systems after an integration on the wooden model in the last quarter of 1986. Preparatory work for a modification of ROSAT for a start on an Atlas/Centaur rocket will commence with the beginning of the next quarter. In order to keep the start possibilities for ROSAT open with the shuttle as well as /4 with the Atlas/Centaur - open to the end of the year at the latest - all that hardware work was pushed back which excluded either one or the other possibility. The resulting planning allowed, nevertheless, a start readiness for the alternative Atlas/Centaur in November 1988.

Keeping the aforementioned stipulated conditions in mind, the projected tasks run according to schedule.

Reviews

Design Review No. 2 was successfully carried out on May 14. The proposal of an Operational Concepts Review arising from the nine recommendations, must be prominently mentioned. The time of the second or the third quarter of 1987 has been assigned for this review by the project management.

The 14th status review at the chief contractor was conducted in May.

On April 21, a discussion took place regarding the consolidation of the GSOC's cost planning for ROSAT. With respect to the plant preparation costs, the following procedure was agreed upon by project management:

- the budgeted costs in the project plan will be fully utilized.
- GSOC plans all tasks under the stipulated conditions of the present personnel, and it determines a hypothetical start readiness date.
- If a binding starting date is given, then it must be fitted to the hypothetical starting date.

Milestones /5

Milestone M6, the dismantling of the STM, was accomplished with a delay of 1.5 months.

Problems

The presently unknown shelf life of the mirror system (danger of contamination and mechanical deformation) limits the flexibility of scheduling.

The still unsatisfactory quality of gold damping of the flight mirrors must be brought to at least a short-term solution.

1.2 Outlook

It is expected from project management that there will be clarification in the next quarter with respect to the allocation of a carrier by NASA. The following events have contributed to this clarification:

- correspondence of NASA to the BMFT promising an investigation that ROSAT can be compatible with an Atlas/Centaur after minor modification.

- the investigation to be conducted by NASA of the "Mixed Fleet Concept" which concludes with the "Mixed Fleet Launch Support Plan" and which shows those payloads whose start with a rocket is advisable.

- the first shuttle start manifest which takes the consequences /6 of the "Rogers Report" into consideration and, therefore, will show a more realistic starting date for ROSAT with the shuttle.

The following activities must be especially emphasized for the next quarter:

- dismantling of the structure after refurbishment.

- concluding additional system tests of the EM/QM/STM phase (Delta-IST AMCS, orbit simulation test).

- concluding investigation of the optimizing of parameters for the gold damping of the mirror dishes.

- operational talks for a start of ROSAT on an Atlas/Centaur at General Dynamics.

1.3 Overview of Problems /7

Area	Type of Problem
1. Management	- At present, no problems at the chief contractor

Area	Type of Problem
2. System	- Failure of high vacuum in the HRI-detector on the attached ion pump needs to be clarified and eliminated
3. Mechanical Subsystems	- At present, no problems
4. Electrical Subsystems	- Exceeding the temperature limits on the /**/ solar generator on the open loading bay in the shuttle and during direct contact with the sun's radiation need to be prevented by altering shuttle orientation in the PIP.
5. Telescope	- Assembly of the FM-mirror system has been interrupted due to irregularities in the gold damping.
6. Assembly	- At present, no problems
7. Ground Equipment	- At present, no problems
8. Mission Safety	- At present, no problems
9. Launch Vehicle Interface	- Designation of a take-off time by NASA is open
10. Mission	- Mission operation and simulator development suffer from understaffing. /8
	- off-line data processing concept remains open.
11. Schedule	- In the building parts acquisition there are possibilities for postponements.
	- The planning for allocations of the PANTER test site shows incompatibilities whose elimination can have consequences with regard to the schedule.

(/*/ means that these items have been added to the list [none added];
/**/ means that these problems have been resolved [see Item 4]).

2.0 System /9

System Technology

In order to work out the most cost-efficient solution for the preparatory measures of salvaging ROSAT in orbit in the event of an error after separation from the RMS, an examination was conducted into the necessary changes for a simpler solution regarding the separation of the antenna boom. For this purpose, it was recommended that the bolted joint be changed so that the bolt can be pulled thus releasing the antenna boom from the satellite.

The necessary changes for the re-locking of the telescope cover were also analyzed and a tentative cost estimate for the execution of these measures was made.

RF Compatibility

The RF-Compatibility Test with the GOSC was prepared and successfully carried out.

Orbit Simulation Test

Preparations for the orbit simulation test began with the development of a draft for the test procedure. For this, a start with the shuttle was assumed as the baseline. A timeline was made available for each of the four test phases: safe mode, checkout mode, pointing mode, and scan mode.

It was also necessary to define for this the ground activities for a simulated contact with the ground station.

Operating Manual /10

For the ground operating manual, there is a first draft dealing with the checkout-phase on the RMS and its deployment as well as the chapter dealing with the shuttle. It was decided to initially continue working on those chapters of the manual that are independent of the carrier system.

3.0 Mechanical Subsystems /11

3.1 Structure/Mechanisms

The STM-structure was sent, according to schedule, to the MBB for refurbishment. The fabrication of the FM-parts could be concluded and

also the refurbishment in accordance with the schedule and specifications. The FM-structure is supposed to be handed over to the DS on July 7, 1986. The process of transfer documentation (ADP) was initiated.

The reworking of the stowage chart (corrections, construction deviations, as-built status) for the ADP was concluded. Based on the DS-commentaries the MBB revised the reports on stress analysis, on modal survey- and static load-test, as well as the report on fracture mechanics.

The work and tests on the FM-TDM have been pretty much concluded. The construction groups for the assembly of the FM-ABM could be made available. The assembly has not yet been started since a decision on the retrieval work had still not been reached.

Work continued on the test specifications and -equipment for the FM-SSM and the FM-TDM. The tests on the SSM were postponed for the time being until the "Atlas/Centaur" decision is made. Upon completion of the SSG from the RSGF, the RSGF was sent to the Firm of SPAR for the purpose of repairing color damages.

3.2 Thermal Budget / 12

The main activity for the reporting period consisted in the continuation of the evaluation of the details from the solar simulation test. This evaluation will probably be finished by September 1986. After the dismantling of the thermal isolation from the structure followed its checking and improvement for the FM. New FM-MLI were made.

An MLI-blanket venting and repressurization analysis was made available.

4.0 Electrical Subsystems / 13

4.1 and 4.2 Energy Supply, Pyrotechnics

In order to review the production status, the FM-component schedule, and the processing status of documentation of both subsystems, the following summary shows that

- the electronic boxes Shunt and Pyrotechnics have been fabricated up to the concluding surface treatment.

- the electronic boxes PCU, BCU, and PDU need only minor adjustment work before the final closure. For this purpose, there will be a must-inspection by quality assurance on July 8, 1986.

- the FM-solar generator fabrication is still halted since the sample-test became drawn out and will only be concluded around the end of July 1986. As soon as the test report, whose delivery is expected for the middle of August 1986, becomes available then the execution of a CDR at AEG in Wedel will be possible. A date for the CDR and the continuation of the fabrication of the FM-panels can only be set after a final decision on the carrier system.

- on the basis of the results of the WS-tests at the IABG, / 14
  the positioning of the seam location of the battery to the battery radiator must be clarified.

  In reference to this, it is planned that there be a battery cycle test of four to eight weeks duration with the EM-battery for the determination of the EOL-power loss.

- the test specifications for the FM-electronic boxes were largely reviewed by the project management.

- there are no disturbance reports which affect the FM-fabrication.

- fabrication and test of the FM-electronic boxes run according to schedule.

4.3 Cabling

In summary, it can be reported that

- the FM-cabling network will be ready for integration into the FM-S/C after the gas-release test at the ESTEC.

  The report from the gas-release test is expected in the beginning of August 1986.

4.4 Data Processing / 15

The flight model of the DPS is in a satisfactory processing- or production status. Delivery delays of the radiation-hardened RCA-storage blocks remains a problem.

Operational tests with additionally obtained base plates where commercial building parts were utilized, have already been carried out to a point that when the original flight construction parts arrive, they can easily be fitted. In about 8-10 weeks upon receipt of the RCA-building blocks the DHS-delivery to the system can be counted on.

There were substantial activities in the S/W-area. All change requests in the EM-program and in the AIT were carried out so that the modified programs can already be used for the orbit simulation test.

Neither the System-EMC test nor the RF-GSOC-Interface test in Weilheim have led to modifications in the DPS.

The problem of time synchronization was satisfactorily solved by a suggestion from the MPE.

4.5 Data Transmission / 16

The operation of the subsystem data transmission ran without problems and according to plan for this reporting period. The RF-GSOC compatibility test was successfully concluded. The still open parameters (degree of modulation) are being optimized in accordance with the measurements.

- Transponder

  Both instruments have undergone the planned refurbishment by the supplier. On this occasion, the defects that had occurred were analyzed and eliminated. Their return at the MBB is expected in the beginning of July.

- Decoder

  The overdue construction parts were delivered in the meantime. The fabrication and adjustment tasks were carried out without delay so that the delivery tests can be expected for the end of July/beginning of August.

- Antenna

  The antenna models are in place, and also the test procedures so that the delivery tests can be started in July, as planned.

4.6 Position Measurement/Position Control / 17

- Star Sensor:

  The mounting of the baffle shield was improved. The electrical assembly of the FM-STE was continued.

- Gyroscope:

  The electronic box for the FM has been finished and the PCB's, aside from a few missing pieces, are in place.

- Reaction Wheel:

  The PCB's for the FM have been finished with the exception of one transistor which has to be exchanged.

- AMCE and Magnetometer:

  The FM-Magnetometer base plates were re-aligned and balanced at the Firm of Dr. Foerster. During the inspection of the sensor heads, deficiencies in the soldering were noticed. A discussion on the subject is still to be held.

- AMCD:

  The developmental model of the AMCD was sent for repairs to the DS by the MBB.

- Subsystem Tests:

  The static and dynamic test procedures for the AMCS software test were completed.

  The preparations for this test are almost complete and their execution is planned for the middle of July 1986.

Problems: Missing construction parts impede and delay the FM-completion of the following components: / 18

Star sensor	(Resistor: ATB200 3K00)
Gyroscope	(Condenser: RH02 1.8 µF, trimming condensers)
Reaction Wheel	(Transistor 2N3501)
AMCD	(RCA-RAM's)

This probably makes a delivery of the FM-AMCS subsystem possible no sooner than the end of March 1987.

5.0 Payload / 19

5.1 X-Ray Telescope

5.1.1 Telescope-QM and -FM

The telescope-QM was used within the framework of the system-AIT-tasks in a test on the x-ray test assembly PANTER designed to develop a method for an entry into the vacuum chamber. This "telescope handling test" was successfully conducted.

The components of the telescope flight model have been completed with the exception of the cover, and they were partially test-assembled. These jobs are on schedule.

5.1.2 Mirror System

The problem of the inclusion of hydrocarbons in the gold coating during the damping process at the Firm of Balzers could not be solved during the reporting period. The measures taken have led to an improvement in the damping apparatus (additional cleanliness, installment of additional cyrogenic pumping surfaces, changes in the vacuum system) which, in turn, have led to a substantial improvement in the gold coatings; the reflection values measured by x-rays have not met specifications, however. In addition, parameter examinations have led to unacceptable results for gold damping with an apparatus which used to be satisfactory for gold-coating of mirror samples. Plans, therefore, call for the determination / 20 and execution of a test program intended to improve gold damping in such a way that the stated demands are met. This test program is to be concluded by late Fall of this year.

The assembly of the mirror system is still on hold.

In order to be prepared for a possible postponement of the starting date with the shuttle to the beginning of the nineties, examinations for the storage of the mirror systems were initiated. These results are worth mentioning:

- The storage of the mounted mirror system carries the high risk that the gold coatings will get contaminated. The contamination would affect the reflectivity of the mirror system in such a way that the scientific objectives of the mission are not attained.

- It is recommended that the individual mirrors are stored without the gold coating.

- Special measures in preparation for the storage of the individual mirrors are to be taken now.

- The assembly of the flight mirror systems must begin about 21 months before the starting date.

The tasks related to the contract separated from the main contract and dealing with the fabrication of the individual mirrors of the flight model at C. Zeiss, have been concluded. Since special measures for the prolonged storage of the individual mirrors are necessary (see above), /21
it is planned to adjust for the remaining mirrors with the C/D chief contractor in August 1986

5.1.3 Focal Plane Instrumentation

The FI-EM continued to be successfully employed at the systems tests.

The assembly of the FI-FM was continued. Tests at the component level run according to schedule. There are no problems at the focal plane instrumentation, the schedule is very tight, however.

Unresolved problems exist at the HRI and at the testing unit PANTER.

- Vacuum loss at the HRI-EM

  Renewed problems with the HRI-ion supply pump and its supply caused the removal of the HRI-EM from the FI. It was returned to the SAO for repairs and for further tests. Arrangements have been made to assure a timely delivery before the orbit-simulation test takes place.

- Availability of the PANTER-testing unit

  The question of "overbooking" of the PANTER-testing unit by various project demands (compare the last quarterly report) can only be solved by laying down priorities. It is planned to make these determinations within the framework of future tasks. The consequences on the adjustment date of the FI cannot be excluded, if there is a need for substantial x-ray tests in the PANTER-testing unit for the solution of the gold damping problem.

5.2 Wide Angle Camera (WFC) /22

- Activities during the reporting period

  - EMC-test successfully concluded

- Design Review No. 2 was held on May 14-15, 1986 at the DS
- Information exchange was held regarding a possible start with the Atlas/Centaur
- GSOC interface discussions

- Outlook

Preparations for an "orbit simulations test" in September 1986

6.0 Assembly, Integration, and Test /23

- EMC Test

The concluded EMC tests during the last reporting period showed radiated interferences in the power supply system and in the focal plane instrumentation in excess of permissable values. The emissions could be reduced through changes in the hardware. Tests showed that the specified values can now be maintained.

- RF Suitcase Test

The test was successfully carried out and according to plans.

- STM/EM Model

The STM/EM model was dismantled since the structure came to MBB for refurbishment.

The EM-components were again built into the auxiliary structure and electrically integrated.

The telescope was subjected to a handling test at MPE Garching. Handling in accordance with the respective procedures was confirmed.

In the past systems tests a considerable number of improvements in the C/O software was proposed. These were integrated and tested.

The return of the AMCS by the subcontractor cannot be expected /24 before July 1986. This delays the following AIT-sequence. In order to reduce the delay, the later scheduled tests of the FI and those of the second tape recorder were moved up.

- Documentation

The revision of the integration regulations for the FM was started and planning support was given for the newly planned orbit simulation test. Unresolved interference reports from the systems tests were processed and closed, as much as possible.

- Start Vehicle

Investigations were started and an alternate time schedule was set up for a possible change onto a rocket (Atlas/Centaur).

- Outlook

- Revision of FM-documentation
- FI-software tests
- Delta IST of the AMCS
- Orbit simulation test
- Investigations into the consequences of a possible change-over of ROSAT onto an Atlas/Centaur.

7.0 Ground Support Equipment / 25

7.1 Electrical Ground Support Equipment and Checkout Software

The EGSE and the C/O software were utilized for the operation and control of the satellite-EM in the EMC-investigations and with the FI-tests.

The C/O -sequences were revised from the conducted tests, taking the NCR into account. The development of the C/O-sequences for the orbit simulation test was started. The adjustments to the modified integration procedures were tested.

Stored test data were checked for the clarification of the NCR's.

The manuals for the S/C-EGSE, TT & C-station, and for the programming of the RF-measuring instruments were revised. The new, revised editions of the specifications for the TT & C-station as well as the monitor tables were also published.

7.2 Mechanical Ground Support Equipment

Aside from the processing of the NCR's, there was a revision made to the S/C- and the telescope handling procedure.

7.3 Optical Ground Support Equipment

No projects.

8.0 Mission Safety / 26

- STS-Safety

- Check of the Materials List Edition 4 by NASA-GSFC

  At a NASA-interface conference on May 13, 1986 at the DS, there were discussions regarding the proceedings used in checking the NASA-commentaries.

  At a subsequently held management conference with DS, there was agreement that the inspection report of the NASA-GSFC "Material Group" will make no additional NASA-requests. The reason is that DS, having the additional information from NASA-JSC and, therefore, being in the position to render better evaluations of materials, can now resolutely prepare the information needed for NASA.

- STS-Safety (Ground Operations)

  The complaints made in Hazard Reports RS1 (G) and RS2 (G) during the STS-Safety Inspection, Phase II on October 10, 1985, dealing with the safety aspects of the gas rinsing systems for the S/C-transport container, for the telescope, for the WFC, and with the MGSE-lift devices, caused the necessary revisions which will be presented to NASA-KSC for approval in the beginning of July, 1986.

- Quality Assurance

  The checking into interferences of level 2 was continued.

- Central Purchasing of Construction Parts (CPP) / 27

  In order to check the development of CPP, a status conference was held on June 26 and 27, at the MBB. In summary, it can be reported that the delivery of the remaining construction parts to the users is close to conclusion.

The DS-"delay"-list, Edition 8, dated June 27, '86, identifies a total of eight "line items".

9.0 Launch Vehicle Interface / 28

- PIP-Annexes

- The processing situation of STS/ROSAT documentation (PIP, PIP Annexes) was discussed within the framework of another NASA-Interface conference at the Firm of DS on May 13, 1986. As a follow-up to this conference, NASA-JSC gave the following "response dates" after DFVLR-requests for PIP-annexes 1, 2, 4, 5, and 6:

  - Annex 1: October 31, 1986
  - Annex 2: August 15, 1986
  - Annex 4, 5: August 01, 1986
  - Annex 6: August 15, 1986

- Because of a possible change-over in launch vehicle interface to the Atlas/Centaur, it was decided in agreement with the NASA-GSFC project management, not to develop any new PIP-annexes, for the time being.

10.0 Mission Operation / 29

10.1 Work Progress

Coordination

In April of 1986, a check was made by the project management on the cost for the ROSAT-bottom segment. Because of the uncertain start situation, GSOC's request for a budget increase for operation preparations was denied, for the time being.

The GSOC was requested to check when the bottom segment could be flight-ready considering all additional tasks, without an increase in the fixed annual material budget of the project plan and a simultaneous "holding the line" on total resources. This led to a start-readiness for October 1989. An important limiting condition for this renewed planning was the necessity for highly-qualified work group personnel.

The collaboration between GSOC and industry (MBB, DS) created the possibility for individual technical discussions aside from the already

existing contacts. In order to clarify technical boundaries, there were discussions between the GSOC and NASA/JPL as well as with MPE- and WFC-representatives (RAL, MSSL, Leicester).

Flight Operation

Work continued on the assembly of the command data bank. At the same time, the various demands of the satellite subsystems and experiments are examined comprehensively in order to define necessary /30
changes to the GSOC-command system which are fair to all ROSAT-subsystems and experiments.

In order to make the design of the telemetry processor possible, the functional demands of the subsystems were analyzed. Discussions on this subject have taken place with WFC-representatives, and discussions with MPE and DS have been prepared.

In joint talks with GSOC and MPE at the ground station in Weilheim, a concept for the "time synchronization" could be attained which was based on an MPE-proposal. The work on the "mission operations support plan" was again postponed (see "Problems" in the Quarterly Reports I and II/86).

Ground Operation

The scope of the tracking tests at the ground station in Weilheim with the IRAS-satellite included the examination of the station characteristics during the occurrence of the so-called "cone of silence". Moreover, several 1 Mbps-Downlink-tests were successsfully carried out.

Documents SIRD and NSP, presented by NASA, were checked and agreement was reached together with representatives of NASA during a working discussion.

Mission Planning and Analysis

The efforts connected with the central program for site determination, were continued. Preparations for tests with data from a tentative simulator version are about to be concluded. The work on the star catalogue handling software was continued. The participation /31
at the AMCS performance demonstration tests was prepared. The development tasks on the operational systems for site determination and -control were continued. In the area of mission planning, the requests were further fine-tuned, after the corresponding analysis a tentative version of a functional specification was developed and distributed for review.

The contemplated method of track determination and station predictions for ROSAT was tested with the help of IRAS tracking passages. The frequency of occurrence of the "cone of silence"-problems with ROSAT was analytically examined.

The development of the ROSAT-antenna aspect angle at full scan-mission was checked and presented in a TN.

Data System

Within the scope for the preparations for the data system compatibility test between the ROSAT-FM and the GSOC, the software for the reduction of the telemetry for the interface computer and the conversion of telemetry- and command blocks were completed.

Tests could not be carried out as yet.

Auxiliary software for the take-over of the WFC-data base in the GSOC-data base is operational. A specification for verifying of WFC-commands in the GSOC is under preparation.

AMC Simulator

The simulator-EXECUTIVE-software was subjected to"timing tests" with the GSOC Micro PDP. The development of transformation routines (star tracker) has been concluded.

At the data bank initialization program, the initialization /32
was coded via ASCII files. The software packet for the simulation of the satellite's outer field and of the sensors (DDS package), made available by RAL, is now complete and module-tested with the GSOC. Final delivery can only be made within the framework of the simulator-total integration upon delivery of the interface system to be developed by the Firm of DS.

10.2 Problems

The present bottom segment budget planning leads to a start-readiness on October 1, 1989. If an earlier starting date becomes reality, then an additional increase in personnel (independent personnel, material costs) becomes necessary.

The system integration of the ROSAT AMCS-simulator for the end of 1986 is endangered by the delayed projection of the DS-contract for the development of an interface between AMCS simulator hardware and the simulation computer at the GSOC. An additional delay will necessitate

making additional material available.

In the area of "flight operations" there is still a shortage of two people at the end of the reporting period.

10.3 Personnel Status

See appendix.

10.4 Schedule / 33

Schedule adjustment will follow the setting of a new starting date. At this time and until further notice, the old schedule is valid. (See Quarterly Report IV/85).

11.0 Schedule / 34

- Planned Dates

  The planned dates of the contract milestone plan having the takeoff date of October 30, 1987, are no longer in agreement with the actual status.

  The last shuttle start manifest of NASA, dated June 2, '86, showed for ROSAT the date of September 1, 1991, as the starting date. The attempts of the project management at NASA-GSFC to make a start on an Atlas/Centaur as launch carrier possible, take as the origin a starting date of November 1988.

- Actual FM-Status

  The presently valid DS-schedule for the STM-integration, dated April 14, 1986, shows the same date of July 7, 1986 for the conclusion of the structure overhaul. The additional tests for the subsystem site control and for the orbit simulation test suffered only minor postponements.

- Actual FM-Status

  For the two alternative launch carriers there are two corresponding time schedules. The alternative shuttle shows a storage time for the ROSAT bus from October 1987 until December 1990.

  The alternative Atlas/Centaur leads to start-readiness for Nov. 1988, taking into consideration a buffer time before transport to the KSC.

Key to pages 23 and 24:

A) Release, B) Processing, C) Milestone Plan, D) EM, QM, STM, ENTW., Production, S/S-Tests, AIT, E) Project Directors, F) Level G) Page 1 of 2, H) from:, I) Last Change, J) Due Date, K) Milestones and Activities, L) Remarks: DRI Planning Status Planning Status Nov. 6, '85 Actual Status. - 1) Spacecraft Design, 3) Subsystem (SIS) Development, 4) Production EM, QM, 7) EM Delivery MA, (M3) FI, WFC, 10) M4, ROSAT ready for Modal Surv. Test, 17) M6, Dismantling Spacecraft, 19) Structure Overhaul.

Key to page 25:

A) Remarks:, 1) Production FM, 3) M7, Delivery MA, 4) Delivery FI, 5) Delivery WFC, 6) AIT Telescope FM, 8) M8 ROSAT FM Ready for Environment Tests, 11) Preparation Bus, 14) Transport to the KSC, 15) KSC Launch Preparation.

Key to page 26:

A) Remarks: DRI Planning Status Planning Status Nov. 12, '85, Actual Status, 1) Production FM, 3) Integration S/S on Auxiliary Base, 4) Modification for Atlas/Centaur, 5) Electrical Integration, 6) M7 Delivery, 7-8) Delivery, 9) AIT Telescope, 10) M8 ROSAT FM Ready for Environment Tests, 12) Compatibility Test GSOC, 15) Transport to the KSC, 16) KSC Launch Preparation.

DFVLR

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Bereich Raumfahrt

A) FREIGABE: _____

B) BEARBEITUNG: _____

C) MEILENSTEINPLAN

ROSAT D) EM, QM, STM, ENTW., FERTIGUNG; S/S-TESTS, AIT

E) PROJEKTLEITER:

F) STUFE

G) BLATT 1 VON 2

H) ORIGINALPLAN VOM: DR I

I) LETZTE ÄNDERUNG: _____

J) STICHTAG: 30. 6. 1986

K)	MEILENSTEINE UND AKTIVITÄTEN
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2	M2 DESIGN REVIEW I
3	UNTERSYSTEM (SIS) ENTWICKLUNG
4	FERTIGUNG EM, QM
5	S/S TESTS EM, QM
6	AIT TELESCOPE QM
7	EM-BEISTELLUNG MA,(M3) FI, WFC
8	AIT BUS EM
9	ROSAT INTEGRATION
10	M4, ROSAT FERTIG ZUM MODAL SURV. TEST
11	MODAL SURVEY TEST
12	RF SUIT CASE TESTS JSC (J), GSOC (G)
13	PRE IST, IST
14	EMC TEST
15	SOLAR SIM TEST
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17	M6, RAUMFAHRZEUG AUSEINANDERBAU
18	AUSEINANDERBAU STM
19	STRUKTUR ÜBERHOLUNG

1983 1984 1985 1986 1987

J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

MA WFC FI J G J G M5 DR 2

L) BEMERKUNGEN: ..... : DRI – PLANUNGSSTAND ▭ : PLANUNGSSTAND 6. 11. 85 ▬ : IST-ZUSTAND

DFVLR

Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V.

- BEREICH FÜR PROJEKTTRÄGERSCHAFTEN -

FREIGABE: ____________________

BEARBEITUNG: ____________________

MEILENSTEINPLAN

ROSAT EM, QM, STM, ENTW., FERTIGUNG, S/S-TESTS, AIT

PROJEKTLEITER

STUFE

BLATT 2 VON 2

ORIGINALPLAN VOM: ____________

LETZTE ÄNDERUNG: ____________

STICHTAG: 31. 3. 1986

	MEILENSTEINE UND AKTIVITÄTEN	1983 (J F M A M J J A S O N D)	1984 (J F M A M J J A S O N D)	1985 (J F M A M J J A S O N D)	1986 (J F M A M J J A S O N D)	1987 (J F M A M J J A S O N D)
1	MOUNTING EM BOXES HARNESS AT INT. STRUCT				□	
2	DELTA IST AMCS				□	
3	ORBIT-SIMULATION PRE TEST				□	
4	ORBIT SIMULATION TEST				□	

BEMERKUNGEN:

ORIGINAL PAGE IS OF POOR QUALITY

DFVLR

Deutsche Forschungs-und Versuchsanstalt
für Luft-und Raumfahrt eV
Bereich Raumfahrt

FREIGABE: _____
BEARBEITUNG: _____

MEILENSTEINPLAN

ROSAT FM FERTIGUNG, S/S TESTS, AIT

PROJEKTLEITER: ALTERNATIVE SHUTTLE

BLATT 1 VON 1

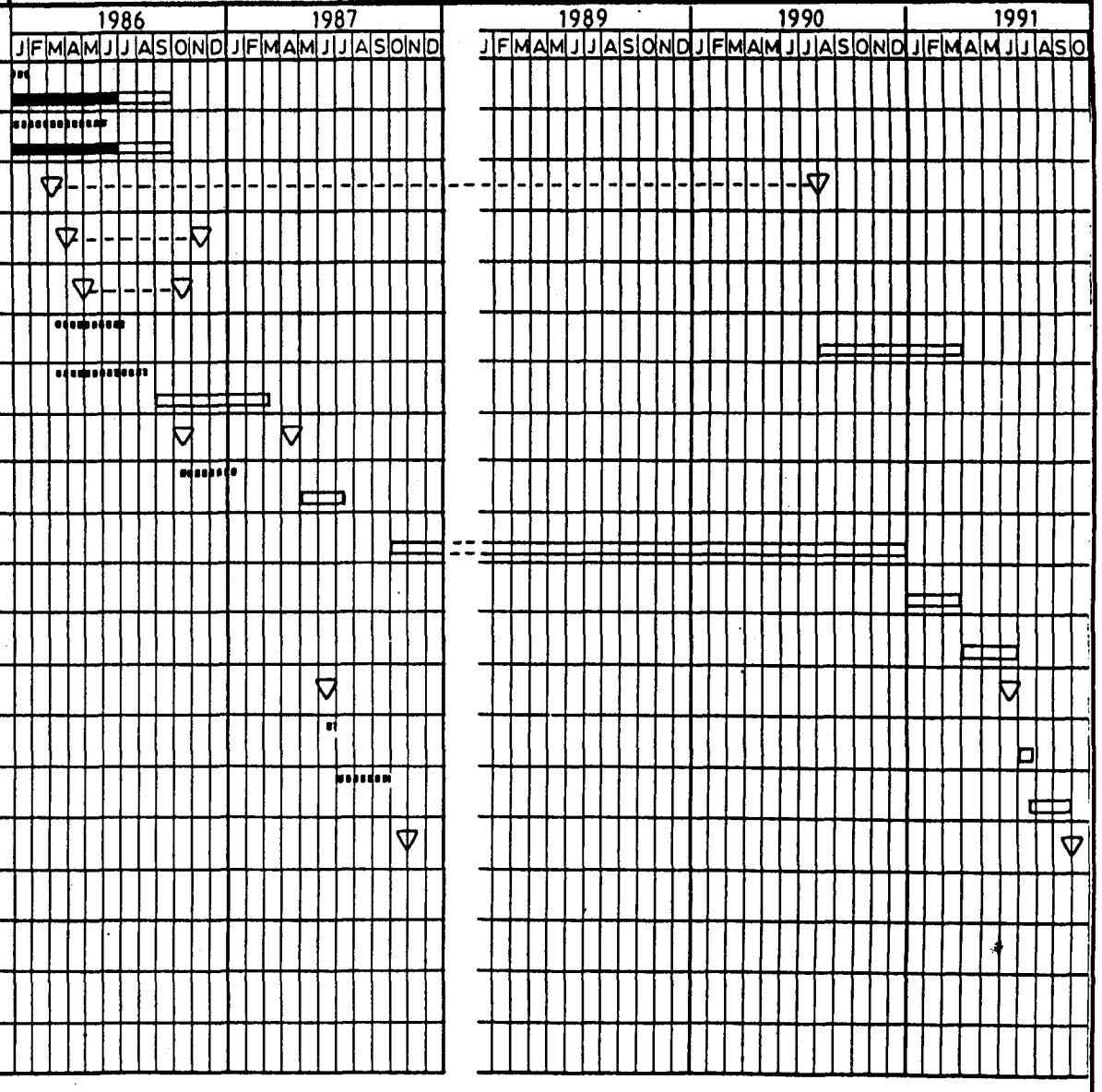
STUFE

ORIGINALPLAN DRI VOM:

LETZTE ÄNDERUNG: _____

STICHTAG: 30. 6. 1986

	MEILENSTEINE UND AKTIVITÄTEN	
1	FERTIGUNG	FM
2	S/S TESTS	FM
3	M7, BEISTELLUNG	MA
4	BEISTELLUNG	F I
5	BEISTELLUNG	WFC
6	AIT TELESKOP	FM
7	AIT BUS	FM
8	M8 ROSAT FM FERTIG FÜR UMWELT TESTS	
9	EMC-, TV-, ACOUSTIC NOISE TEST	
10	BUS STORAGE	
11	VORBEREITUNG BUS	
12	INTEGR. TELESKOP, ALIGNM., IST, BUFFER	
13	M9 PRESHIPPING REVIEW	
14	TRANSPORT ZUM KSC	
15	KSC STARTVORBEREITUNG	
16	M10 START	



BEMERKUNGEN:

A)

RS

DFVLR

Deutsche Forschungs-und Versuchsanstalt
für Luft-und Raumfahrt e.V.
Bereich Raumfahrt

FREIGABE: _____

BEARBEITUNG: _____

MEILENSTEINPLAN

ROSAT

FM FERTIGUNG,
S/S TESTS, AIT
ALTERNATIVE ATLAS / CENTAUR

PROJEKTLEITER: ✓

STUFE

BLATT 1 VON 1

ORIGINALPLAN VOM: DRI

LETZTE ÄNDERUNG: _____

STICHTAG: 30. 6. 1986

	MEILENSTEINE UND AKTIVITÄTEN
1	FERTIGUNG FM (SHUTTLE VERSION)
2	S/S TESTS FM (SHUTTLE VERSION)
3	INTEGRATION S/S AUF HILFSGESTELL
4	MODIFIKATION FÜR ATLAS / CENTAUR
5	ELEKTRISCHE INTEGRATION WFC FI
6	M7 BEISTELLUNG MA
7	BEISTELLUNG FI
8	BEISTELLUNG WFC
9	AIT TELESKOP FM
10	M8 ROSAT FM FERTIG FÜR UMWELT TESTS
11	EMC-, TV-, ACOUSTIC NOISE TEST
12	KOMPATIBILITÄTSTEST GSOC
13	INTEGR. TELESKOP, ALIGNM, TEST, BUFFER
14	M9 PRESHIPPING REVIEW
15	TRANSPORT ZUM KSC
16	KSC STARTVORBEREITUNG
17	M10 START

1984 1985 1986 1987 1988

J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

BEMERKUNGEN: ..... DRI-PLANUNGSSTAND ▭ PLANUNGSSTAND 12. 11. 85 ▬ IST-ZUSTAND

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A)

13.0 Appendix

13.1 Personnel Inventory

13.2 Key to Abbreviations

Key to page 28:

A) Personnel Inventory DFVLR- RF-TN/PA/QS B) (Man-Months), C) Status: June 30, 1986, D) Period/Ideal/Actual *(repeated three times across)*, E) Category I Category II Category III Total *(repeated three times down)*.

Key to page 29:

A) Personnel Inventory DFVLR- RF-RM, B) MISSION OPERATIONS Cost Carrier 2885007, C) Status: June 30, 1986, D) Man-Months Period/Ideal/Actual *(repeat three times across)*, E) Category I Category II Category III Total (MJ), F) Independent Efforts:, G) Budgeted for 1986: at a conversion factor 1 MJ=---, H) Project Plan for 1986, I) results in output:, J) Budget Ideal, K) Project Plan Ideal, L) Contract Status,Actual, M) Ideal corresponds to Project Plan, dated February 14, '85, N) Budget corresponds to GSOC-Planning actually done, O) Correction from 7.2 MM to 10.1 MM compared to Quarterly Report I/86 because of retroactive contract closing.

Key to page 30:

A) Spent Sums since Jan. 1, 1985 Personnel Inventory DFVLR-RF-RM, B) Missions Operations Cost Carrier 2885007, C) Status: June 30, 1986, D) Man-Months Period/Ideal/Actual Period/Ideal/Actual, E) Man-Years Period/Ideal/Actual Period/ideal/Actual, F) Category I Category II Category III Total (MJ), G) Independent Efforts:, H) Project Plan, I) Work done according to actual contract status.

RÖNTGENSATELLIT

A) Personaleinsatz DFVLR- RF-TN/PA/QS

B) (Mannmonate)

C) STATUS: 30.06.1986

	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST
Kat. I	12/84	13.0	8.2	1/85	13.5	8.1	2/85	13.5	8.6	3/85	13.5	9.1
Kat. II	=====	3.5	0.9	====	3.5	1.0	====	3.5	1.0	====	3.5	1.0
Kat. III		4.0	4.1		4.0	3.5		4.0	3.1		4.0	3.4
Insgesamt		20.5	13.2		21.0	12.2		21.0	12.7		21.0	13.5
Kat. I	4/85	13.5	9.3	5/85	13.5	9.6	6/85	13.5	10.8	7/85	13.5	10.2
Kat. II	====	3.5	1.1	====	3.5	1.1	====	3.5	1.1	====	3.5	1.0
Kat. III		4.0	3.9		4.0	3.9		4.0	3.7		4.0	3.7
Insgesamt		21.0	14.3		21.0	14.6		21.0	15.6		21.0	15.2
Kat. I	8/85	13.5	12.1	9/85	13.0	12.7	10/85	13.0	10.7	11/85	13.0	10.3
Kat. II	====	3.5	0.9	====	3.0	1.1	=====	3.0	1.1	=====	3.0	0.9
Kat. III		4.0	3.1		4.0	3.0		4.0	3.2		4.0	2.7
Insgesamt		21.0	16.1		20.0	16.8		20.0	15.0		20.0	13.9
Kat. I	12/85	13.0	10.6	1/86	13.0	8.4	2/86	13.0	7.8	3/86	13.0	9.05
Kat. II	=====	3.0	1.1	====	3.0	2.1	=====	3.0	2.0	====	3.0	1.2
Kat. III		4.0	3.1		4.0	3.2		4.0	2.6		4.0	3.4
Insgesamt		20.0	14.8		20.0	13.7		20.0	12.4		20.0	13.65
Kat. I	4/86	13.0	7.6	5/86	13.0	8.1	6/86	13.0	7.7			
Kat. II	====	3.0	2.1	====	3.0	2.1	====	3.0	1.4			
Kat. III		4.0	3.4		4.0	2.3		4.0	2.5			
Insgesamt		20.0	13.1		20.0	12.5		20.0	11.6			

RÖNTGENSATELLIT

A) Personaleinsatz DFVLR- RF-RM

B) MISSION OPERATIONS Kostenträger: 2885007

C) STATUS: 30.06.1986

D) Mann-Monate

	ZEIT-RAUM	SOLL 1)	IST	ZEIT-RAUM	SOLL 1)	IST	ZEIT-RAUM	SOLL 1)	IST	ZEIT-RAUM	SOLL 1)	IST	Budget 2) 1986
E) Kat. I	1-3/86	19.5	25.7	4/86	6.5	8.9	5/86	6.5	9.3	6/86	6.5	9.9	9.0 MJ
Kat. II	"	19.5	4.4	"	6.5	2.4	"	6.5	2.3	"	6.5	2.3	5.5 MJ
Kat. III	"	4.5	1.6	"	1.5	0.4	"	1.5	0.4	"	1.5	0.4	1.0 MJ
Insgesamt (MJ)	"	43.5	31.7	"	14.5	11.7	"	14.5	12.0	"	14.5	12.6	15.5 MJ
F) FREMDLEISTUNGEN:													
G) o Budget 1986 2)		653.000,-- DM		≙ 3.25 MJ bei Umrechnungsfaktor 1 MJ ≙ 200.000,-- DM									
H) o Projektplan f. 1986 1)		780.000,-- DM		≙ 3.90 MJ "			"	"	"				
I) ergibt in Leistung:													
J) - Budget-Soll 2)	1-3/86	9.8	-	4/86	3.25		5/86	3.25		6/86	3.25		
K) - Projektplan-Soll 1)	"	11.7	-	"	3.9		"	3.9		"	3.9		
L) - tatsächlicher Vertragsstand	"	-	10.1 3)	"		3.4	"		3.4	"		3.4	

M) 1) Soll gemäß Projektplan vom 14.2.85

N) 2) Budget entspricht aktueller GSOC-Planung

O) 3) Korrektur von 7.2 MM auf 10.1 MM gegenüber O-Bericht 1/86 wegen rückwirkendem Vertragsabschluß

ROENTGENSATELLIT

A) Aufgelaufene Summen seit 1.1.1985

Personaleinsatz DFVLR- RF-RM

C) STATUS: 30.06.1986

B) Mission Operations Kostenträger: 2885007

	D Mann-Monate						E Mann-Jahre					
	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST
F) Kat. I	1/85-6/86	93.0	106.5				1/85-6/86	7.75	8.9			
Kat. II	"	111.0	36.4				"	9.25	3.0			
Kat. III	"	21.0	5.9				"	1.75	0.5			
Insgesamt (MJ)	"	225.0	148.8				"	18.75	12.4			
G) Fremdleistungen:												
H) Projektplan:	1985: 710.000,-- ≙ 3.5 MJ			1986: 780.000,-- ≙ 3.9 MJ			1987: 1.870.000,--					
Budget:	1985: 710.000,-- ≙ 3.5 MJ			1986: 653.000,-- ≙ 3.25 MJ			1987:					
I) Leistung entsprechend tatsächlichem Vertragsstand	1.1.85 - 31.12.85		3.36 MJ	1.1.86 - 30.6.86		1.69 MJ						

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Key to page 32:

A) Personnel Inventory DFVLR-RF-RM, B) SIMULATOR Cost Carrier 3885406 C) Status June 30, 1986, D) Man-Months Period/Ideal/Actual *(repeat three times across)*, E) Category I Category II Category III Total (MJ), F) Independent Efforts:, G) • Project Plan for 1986 (Conversion factor 1 MJ .....), H) • Budgeted 1986 .....for contracts to the Firm of DS, I) - results in output per unit time:, J) • contractually obligated:, K) correction from 14.4 MM to 20.5 MM compared to Quarterly Report 1/86 due to retroactive contract closing.

Key to page 33:

A) Personnel Inventory DFVLR-RF-RM, B) SIMULATOR Cost Carrier 3885406 C) Status June 30, 1986, D) Man-Months Period/ Ideal/Actual *(repeat once across)*, E) Man-Years Period/Ideal/Actual *(repeat once across)*, F) Category I Category II Category III Total (MJ), G) Independent Efforts, H) • Project Plan:, I) • Output corresponding to actual contract status.

RÖNTGENSATELLIT

A) Personaleinsatz DFVLR- RF-RM

B) SIMULATOR Kostenträger 3885406

C) STATUS: 30.06.1986

	Mann-Monate			Mann-Monate			Mann-Monate			Mann-Monate		
	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST
D) Kat. I	1-3/86	4.5	5.1	4/86	1.5	1.7	5/86	1.5	1.1	6/86	1.5	1.7
Kat. II	"	-		"	-		"	-				
Kat. III	"	-		"	-		"	-				
Insgesamt (MJ)	"	4.5	5.1	"	1.5	1.7	"	1.5	1.1	"	1.5	1.7
F) Fremdleistung:												
G) o Projektplan für 1986		1.400.000,-- DM ≙ 7.0 MJ (Umrechnungsfaktor 1 MJ ≙ 200.000,--)										
E) o Budgetiert 1986		1.612.000,-- DM ≙ 8.1 MJ incl. 138.000,-- DM für Aufträge an Firma DS										
I) - entspricht in Leistung pro Zeiteinheit:	1-3/86	21.9		4/86	7.3		5/86	7.3		6/86	7.3	
J) o vertraglich gebunden:	1-3/86		20.5[1)]	4/86		6.8	5/86		6.9	6/86		7.8

K) 1) Korrektur von 14.4 MM auf 20.5 MM gegenüber Q-Bericht 1/86 wegen rückwirkenden Vertragsabschlusses.

RÖNTGENSATELLIT

A) Aufgelaufene Summen seit 1.1.1985

Personaleinsatz DFVLR- RF-RM

B) SIMULATOR Kostenträger: 3885406

C) STATUS: 30.06.1986

D) Mann-Monate

E) Mann-Jahre

	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST	ZEIT-RAUM	SOLL	IST
F) Kat. I	1/85-6/86	27.0	33.5				1/85-6/86	2.25	2.8			
Kat. II												
Kat. III												
Insgesamt (MJ)	"	27.0	33.5				"	2.25	2.8			
G) Fremdleistungen:												
H) o Projektplan:	1985: 1.538.000,--		≙ 7.7 MJ	1986: 1.400.000,--		≙ 7.0 MJ	1987: 0.0					
o Budget:	1985: 1.201.000,--		≙ 6.0 MJ	1986: 1.612.000,--		≙ 8.1 MJ	1987: 200.000,--		≙ 1.0 MJ			
I) o Leistung entsprechend tatsächlichem Vertragsstand	1.1.85 - 31.12.85: 5.9 MJ			1.1.86 - 30.6.86: 3.5 MJ								

Key to Abbreviations / 45

1.	AA	Application for Change
2.	AKS	Alignment Control System
3.	AN	Contract Recipient
4.	BMFT	West German Secretary for Research and Technology
5.	CFK	Carbon Fiber Reinforced Plastics
6.	DFVLR	West German Research and Testing Institute for Air- and Space Travel / 46
7.	DFVLR-PL	DFVLR Project Management
8.	DV	Data Processing
9.	IABG	Industrial Sites - Company / 47
10.	INVAR	(Trade name for a special Steel Alloy) / 48
11.	KW	Calender Week
12.	MM	Mass Model / 49
13.	MPE	Max-Planck Institute for Physics and Astrophysics, Institute for Extraterrestial Physics
14.	MPG	Max-Planck Association
15.	RF	DFVLR-Sector Space Travel / 50
16.	ROSAT	X-Ray Satellite
17.	SIMS	Secondary Ion Mass Spectrometry / 51
18.	SKE	Own Cost Rebate Price
19.	SKF	Own Cost Firm Price
20.	TA	Technical Direction
21.	TV	Thermal Vacuum
22.	WSA	Space Simulation Assembly
23.	ZERODUR	(Trade name for the Glass-Ceramic Material of the mirror).

13.2 Abkürzungsverzeichnis

ABM	Antenna Boom Mechanism
ADP	Acceptance Data Package
1. ÄA	Änderungsantrag
2. AKS	Ausricht-Kontroll-System
AIT	Assembly, Integration and Test
AMCD	Attitude Measurement and Control Data Unit
AMCE	Attitude Measurement and Control Interface Electronics
AMCS	Attitude Measurement and Control Subsystem
AMPTE	Active Magnetospheric Particle Tracer Explorer
3. AN	Auftragnehmer
ASCII	American Standard Code for Information Interchange
BAT	Battery
BCU	Battery Control Unit
Bit. Sync.	Bit Synchronizer (Synchronization)
4. BMFT	Bundesminister für Forschung und Technologie
CCD	Charge Coupled Device
CCL	Charge Current Limiter
C&DH	Command and Data Handling
CEL	Control Electronics
5. CFK	kohlefaserverstärkter Kunststoff
CFRP	Carbon Fiber Reinforced Plastics
CITE	Cargo Integration Test Equipment
Cmd	Command
CMOS	Complementary Metaloxyde Silicon
C/O	Checkout
CPP	Central Parts Procurement
CPU	Central Processing Unit

CR	Change Request
CSA	Charge Solar Array
CSS	Coarse Sun Sensor
CZ	Firma Carl Zeiss
DC	Direct Current
DDS	Dynamic Device Simulations
DEC	Decoder
DEC	Digital Equipment Corporation
DFVLR	Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt
DFVLR-PL	DFVLR-Projektleitung
DHS	Data Handling Subsystem
DMA	Direct Memory Access (Direct Access to Memory)
DMOD	Demodulator
DNEL	Disconnection of Non-Essential Loads
DPS	Data Processing System
DR	Design Review
DS	Dornier System
DV	Datenverarbeitung
EAC	Estimate At Completion
ECR	Engineering Change Request
ECS	Environmental Control System
EED	Electro-Explosive Device
EEE	Electric, Electronic, Electromechanical
EEL	Experiment-Electronics
EGSE	Electrical Ground Support Equipment
EM	Engineering Model
EMC	Electromagnetic Compatibility
EOL	End-of-Life
EORD	Experiment Operations Requirements Document

EPD	External Power Dumper
ESA	European Space Agency
ETOL	ESA Test Operation Language
EUV	Extreme Ultraviolet
EVA	Extravehicular Activity
FEM	Finite Element Model
FI	Focal Plane Instrumentation
FLS	Fiducial Light System
FM	Flight Model
FMECA	Failure Mode Criticality Analysis
FWHM	Full Width at Half Maximum
GF	Grapple Fixture
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
GSOC	German Space Operations Center
GVS	Gas Supply System
GYP	Gyropackage
GYPE	Gyropackage Electronics
GYPS	Gyropackage Sensor
HC	Heater Control
HEAO-2	High Energy Astronomy Observatory ("Einstein")
HIREL	High Reliability
HK	Housekeeping
HP	High Power
HRI	High Resolution Imager
IABG	Industrieanlagen-Betriebsgesellschaft
IC	Integrated Circuit

ICD	Interface Control Document
IEEE	Institute of Electrical and Electronics Engineers
INVAR	(Handelsname für eine besondere Stahllegierung)
IST	Integrated System Test
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
kbps	Kilobit per second (deutsch: kbit/s)
KSC	Kennedy Space Center
KW	Kalenderwoche
LCL	Latching Current Limiter
LED	Light Emitting Diode
LHC	Left-hand Circulation
LI	Line Item
LP	Low Power
LSSP	Launch Site Support Plan
MA	Mirror Assembly
MAC	Mirror Attachment Cone
Mbps	Megabit per second (deutsch: Megabit/s)
MC	Magnetic Coil
MCC	Mission Control Center
MCP	Microchannel Plate
MDM	Multiplexer/Demultiplexer
MDR	Master Data Record
MED	Magnetic Electron Deflector
MES	Mechanisms Subsystem
MGSE	Mechanical Ground Support Equipment
MIP	Mandatory Inspection Point

MLI	Multilayer Insulation
12. MM	Magnetometer
↘ MM	Massenmodell
MOM	Mission Operations Meeting
MOU	Memorandum of Understanding
13. MPE	Max-Planck-Institut für Physik und Astrophysik, Institut für Extraterrestrische Physik
14. MPG	Max-Planck-Gesellschaft
MPSS	Mission Planning and Scheduling System
MRB	Material Review Board
MSA	Main Solar Array
MSSL	Mullard Space Science Laboratory
MUC	Multi-Use Container
MUDAS	Modular Universal Data Acquisition and Control System
MVL	Main Voltage Limiter
NASA	National Aeronautics and Space Administration
NCR	Non Conformance Report
NRZ/L-Code	Non-Return-to-Zero/L-Code
NSI	NASA Standard Initiator
NSP	NASA Support Plan
OBC	Onboard Computer
OGSE	Optical Ground Support Equipment
OIB	Orbiter Interface Box
OSR	Optical Surface Reflector
PCB	Printed Circuit Board
PCU	Power Control Unit
PDP	Programable Data Processor (Typbezeichnung von DEC)
PDU	Power Distribution Unit
PETS	Payload Environmental Transportation System

PGHM	Payload Ground Handling Mechanism
PHP	Paraboloid-Hyperboloid Pair
PIP	Payload Integration Plan
POCC	Payload Operations Control Center
PPF	Payload Processing Facility
PRD	Program Requirements Document
PRD	Project Requirements Document
PROM	Programmable Read Only Memory
PSE	Payload Support Equipment
PSK	Phase-shift Keying
PSPC	Position Sensitive Proportional Counter
PSS	Power Supply Subsystem
PYB	Pyrotechnics Electronic Box
QM	Qualification Model
RAL	Rutherford Appleton Laboratory
RAM	Random Access Memory
RCA	Radio Corporation of America
RE	Radiated Emission
RF	Radio Frequency
15. RF	DFVLR-Bereich Raumfahrt
RfA	Request for Action
RfW	Request for Waiver
RMC	Right-hand Circulation
RMS	Remote Manipulator System
ROMP	Realtime/Offline Mission Processor
16. ROSAT	Röntgensatellit
RS	Radiated Susceptibility
RSGF	Rigidized Sensing Grapple Fixture
RSS	Rotating Service Structure
RT	Real Time

	RW	Reaction Wheel
	RX	Receiver
	SAO	Smithsonian Astrophysical Observatory
	S/C	Spacecraft
	SCOE	Special Checkout Equipment
	SERC	Science & Engineering Research Council
	SEU	Single Event Upset
17.	SIMS	Sekundär-Ionen-Massen-Spektrometrie
	SIRD	Support Interface Requirements Document
18.	SKE	Selbstkosten Erstattungspreis
19.	SKF	Selbstkosten Festpreis
	S/L	Serial Load
	SMDR	Special Master Data Record
	SOC	Science Operations Center
	SOS	Silicon on Sapphire
	SPF	Single Point Failure
	SPL Code	Split Phase Level Code
	SSM	Single Surface Mirror
	SSM	Separation Switch Mechanism
	ST	Star Tracker
	STC	Star Tracker Camera
	STE	Star Tracker Electronics
	STM	Structural Thermal Model
	STS	Space Transportation System
	SURS	Shuttle Umbilical Retraction System
	S/W	Software
20.	TA	Technische Anweisung
	TC	Telecommand
	T/C	Thermal Control
	TCE	Thermal Conditioning Equipment

	TCS	Telecommunication Subsystem
	TDM	Telescope Door Mechanism
	TM	Telemetry
	TR	Tape Recorder
	TT & C	Telemetry, Tracking and Command
21.	TV	Thermal-Vakuum
	TX	Transmitter
	UK	United Kingdom
	US	Subsystem
	VPHD	Vertical Payload Handling Device
	VPF	Vertical Processing Facility
	WDE	Wheel Drive Electronics
	WFC	Wide Field Camera
	WFCC	WFC-Consortium
22.	WSA	Weltraumsimulationsanlage
	XRT	X-Ray Telescope
23	ZERODUR	(Handelsname für den Glas-Keramik-Werkstoff des Spiegels)
	ZDE	Central Data Electronics